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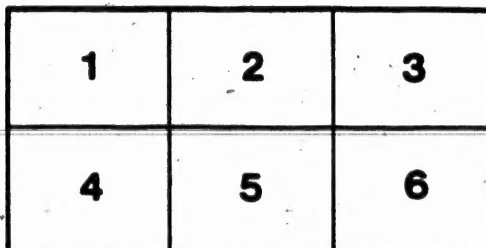
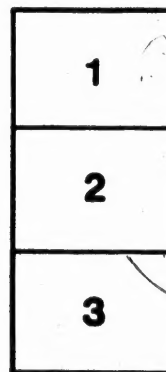
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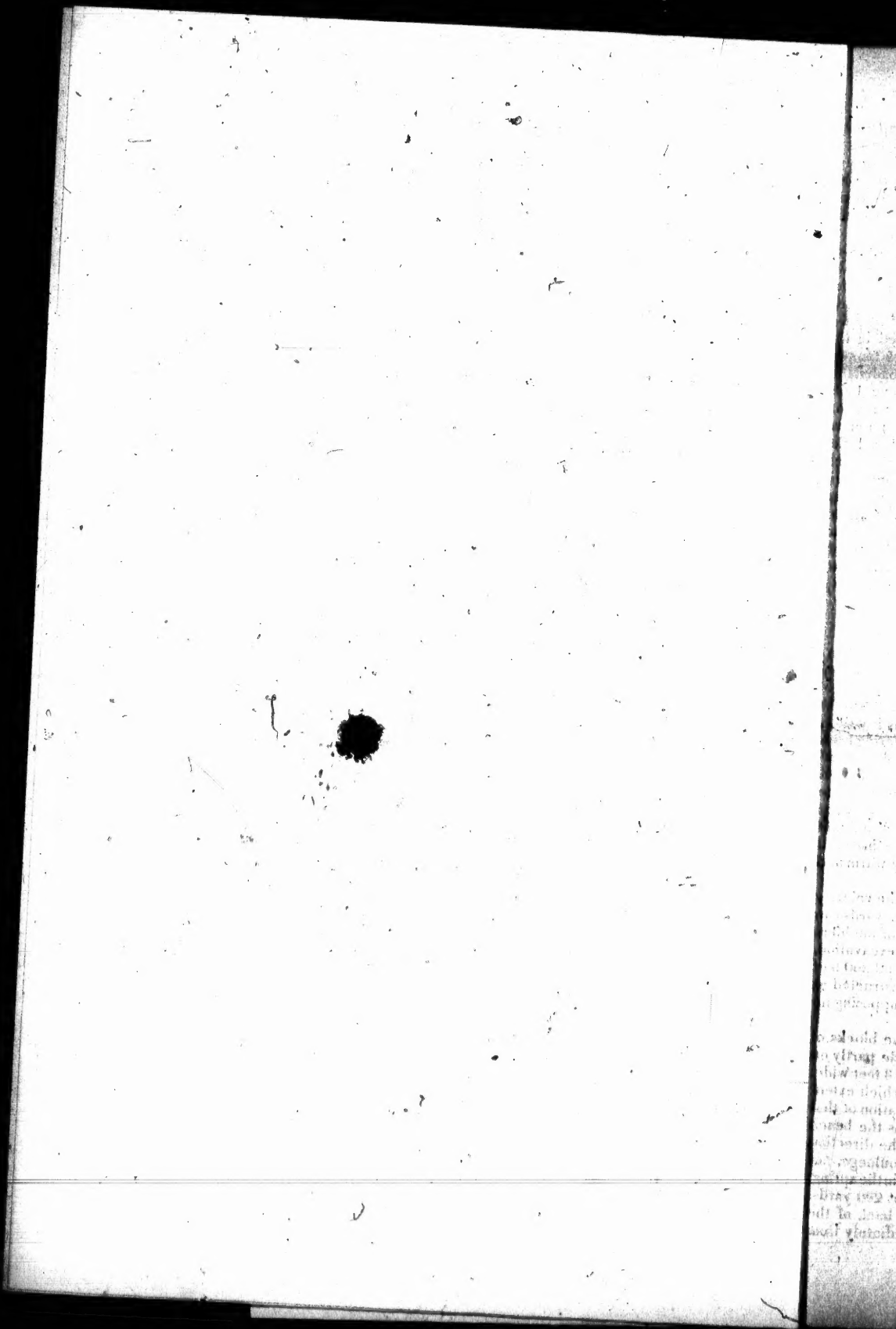
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TO THE COMMISSIONERS
For the Improvement of the Navigation
OF THE
River St. Lawrence,
FROM LAKE ST. LOUIS TO LAKE ST. FRANCIS.

DETAILED REPORT
Of the Survey and Examination
OF THE RAPIDS OF THE
RIVER ST. LAWRENCE,
FROM
Lake Saint Louis to Lake Saint Francis,
FOR THE IMPROVEMENT OF THE
'NAVIGATION,'
ACCOMPANIED BY PLANS, SECTIONS, &c.,
UNDER ACT GEORGE 4, CHAPTER 27,
OF THE
PROVINCIAL PARLIAMENT
of Lower-Canada.

THE principal impediments to Boats with their full cargoes ascending these Rapids, are shoals—shallow places along the Coast near the Beach, where the rapids are too strong in the offing, and shallow strong rapids at several points where boats crews, the power of 2 to 4 horses, or a strong wind with waves are required at each boat to tow her up, after having on account of these impediments, discharged about four-fifths of her lading at the Cascades, thence to be transported by land six miles to the Cascades—and although it is there again reloaded, yet obstructions of the same nature again present themselves in ascending to Lake Saint Francis, and are only overcome by the same tardy and expensive means as are used to get up the comparatively light boat from the Cascades to the Ocean.

And whereas the removal of such obstructions along the rapids and the making of such improvements therein as will enable Durham Boats as well as Bateau to ascend without discharging any particular portion of their cargoes, is the main object of your Commission—it becomes our duty to point out the objects along the whole coast which tend to obstruct, impede, and render both difficult and dangerous to boats thus ascending those Rapids with loads—the several places at which they occur—their magnitude—the best mode of obviating them—and by an estimate, what expense would probably be incurred in fulfilling

this condition—with reference always to the Plan (A.) accompanying this Report—on which is delineated most correctly the sinuosities of the shore, the several Islands which now stand as impelliments to the Navigation, or would serve some particular purpose in the proposed improvement—the soundings throughout the Boat track upwards—and the velocity in miles in the current or rapids at each of the points where improvement is required, from one extreme to the other.

First then, it will be necessary to premise that the Navigation as to the dimensions of the Boat used is governed in some degree by the dimensions of the Chamber Locks and Canals erected on this Coast at the CASCADES—SPLIT ROCK, and COTEAU DU LAC—there being admittance but for boats drawing at most 30 inches water—and of 12 feet beam—of and under this dimension, are all the Durham Boats now used in the Navigation of those Rapids,—and which, with from 20 to 25 tons on board—draw about 30 inches of water—when they are full loaded, as they are in descending they draw about 40 inches—but it has not been noticed that they lead with more than about 25 tons in their ascent, and the Batteaux, when full loaded, with 12 to 14 tons, draw no more than 30 inches water. This therefore may be justly considered the limit proper to be fixed to the improvements proposed, so that such Boats as now navigate these Rapids may be enabled without any additional cost to ascend from LAKE SAINT LOUIS to that of SAINT FRANCIS, through the Rapids with the same quantity of lading as they are at present in the habit of carrying across the LAKE SAINT LOUIS from MONTREAL to the CASCADES,—and which, if done, would complete such Navigation from the PORT OF MONTREAL (or farther down the River) to CORNWALL, in Upper-Canada, in one set of Boats, without the necessity of at all deranging their Cargoes on the way.

In the Locks at the CASCADES, there are 30 inches water.

Along the shore from the CANAL to the Locks at SPLIT ROCK no improvement is required, as there is but very little current, and water enough at a moderate distance from shore.

In the inferior entrance Lock at SPLIT ROCK, there are 27 to 30 inches water, but when the water in the River is very low, as it was in the fall of 1824 or 25, the superior entrance Lock and the clearing from it becomes extremely low, even to 3 or 4 inches upon a bed of hard girt-stone, which here runs across the River, and can only be considered as a continuation of the extensive bed which obtains on the opposite bank throughout the Seigneurie of Beauharnois. It would be somewhat expensive to deepen this—but as long as it remains as it is, (we found 24 inches) the navigation must be considered as liable to a very material interruption whenever the summer happens to be sufficiently warm and dry, to cause a considerable fall in the water of this River.

Immediately above the SPLIT ROCK, at POINTE A DELISLE, the velocity of the current is 8 miles an hour—it is 4 feet deep at 18 or 20 yards (an inconvenient towing distance) from the shore, and nearer full of boulders and blocks of girt-stone. To improve it would require an excavation, partly in the Beach, of 18 feet wide—averaging 2 feet deep and 300 feet long, with a towpath, which may be easily and cheaply constructed at this place, the banks of the River being not very steep and opposing no obstacle to this disposition.

In ascending from this point towards POINTE A CHIEN the blocks of stone would require to be removed—and an excavation made partly on the beach and partly in the river, averaging $1\frac{1}{2}$ foot deep by 18 feet wide, for a distance of about 660 yards, and along the whole of which extent as there is a pretty strong current, a towing path in continuation of that at Pointe à Delisle might be constructed, and particularly as the beach is pretty broad, no slides in the Bank, and on account of the direction given to the ice by the direction of the current at Pointe à Coulange, not liable to be injured by the shoving of that destructive element in the spring.

From this place to POINTE A CHIEN, a distance of about 200 yards, there is water enough close in and not much current, the bank of the river composed of clay, being high and steep, rising immediately from

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the water, and leaving little or no beach, bearing the public road upon its very crest, and exhibiting several recent slides—seems to oppose the plausibility of erecting a towpath along this extent—it therefore requires no improvement.

At **POINTE A CHIEN**, the current runs at 8 miles an hour, is 4 feet deep, and improvement is required here merely on account of the crookedness of the point, and consequently disadvantageous direction in which the horses which are here employed to tow up boats have to draw;—30 yards cutting through the point, 9 feet wide and 10 feet deep will obviate this obstruction, and offer a good towpath for the extent, at any required height above the surface of the water.

From **POINTE A CHIEN** to **POINTE A COULONGE**, 570 yards, there is little or no current, and part of the distance is eddy—it is very shallow for a good way out, and loaded boats cannot approach the shore to within about 50 yards for two-thirds of the distance, it is therefore not necessary here to make any towpath.

POINTE A COULONGE, at 50 feet from shore, in $1\frac{1}{2}$ fathoms water, the current runs 9 miles per hour—the bank is low at this place, and admits of a good improvement being constructed in the beach with a convenient towpath on the surface for the distance of 100 yards, by 18 feet in breadth, and averaging 4 feet deep—this being the whole extent of the current at this point; but the approach to it from below is from the offing, the water being shallow to a considerable distance from the shore all the way down to **Pointe à Chien**.

POINTE A CHENETTE. From **POINTE A COULONGE** to this place, there is but very little current or any thing to obstruct the Navigation by poles, oars, or sails part of the way as from **Coulonge** to the **Potash house**, there is a soft clay bottom and the water rather shallow near the shore, but from the **Potash house** to **Pointe à Chenette**, there is a bolder shore, and $5\frac{1}{2}$ fathoms water in part of the distance at 50 yards from the shore. Along the most of this distance the public road is directly on the crest of the bank, which will effectually prevent its being sloped off to an angle below that of the minimum of pressure to ensure its solidity and the permanency of any work erected in it. As it is at present parts of it are constantly sliding off down to the river below; and we have witnessed marks of its propensity to slide sufficient to be convinced of the futility of erecting any thing like a tow path in it. **Pointe à Chenette** is very narrow, consequently the direction round it is very crooked, and from which two circumstances, arises the difficulty of passing it. In two fathoms water at 50 feet from shore the current runs at 8 miles an hour, and the only improvement necessary to overcome the difficulty at this point is to straighten, by cutting through it a distance of 30 yards 18 feet wide by 8 feet average depth, with a towing-path in the cut, to enable horses or some other power to be applied to the boats more advantageously.

From **POINTE A CHENETTE** to station 19 in the bay below the **POINTE DU MOULIN**, the water is very shallow near the shore, and particularly at the points at stations 16 à 17 and 18, and across the bay between 18 and 19, and navigation is only carried on in this distance which is $1\frac{1}{2}$ mile, by keeping far out from the shore, by taking the line of direction from between stations 15 and 16 a, straight towards the mill point at the foot of the rapids, and as there is but little or no current in this distance and direction, it is quite practicable by means of oars, poles, or sails, in from 3 to 6 feet water.

Therefore a tow path for this distance requiring a channel to be excavated in the beach the whole way, leading to great expense and effecting no other purpose than that which is now effected by oars, poles, or sails, cannot be considered as necessary, or coming within the limits to which our observations are now particularly confined.

POINTE DU MOULIN.—This Point taken altogether is formed by three distinct points of land with most extraordinary indentures or bays between them. They present broken rapids at each of them. Their whole difference of level from above the uppermost to below the lowermost of them is 7 15-100 feet. The velocity of the current at station 22 or

uppermost point for a distance of about 50 yards is 7 miles per hour in 3 feet water, at 20 feet from shore. At the middle point opposite station 21 for about a like distance the velocity of the current is 11 miles per hour in 3 feet water, at 20 feet from shore. But at the lower point opposite station 20, and to the upper part of the same point, the velocity at 20 feet from shore in 4 to 6 feet water varies from 11 miles at the upper part to 14 miles per hour at the lower part of the point, which distance is about 200 yards. The bank is very high at all three of these points; it rises almost perpendicularly up from the water edge 5 to 6 feet deep of stony primitive earth with 10 feet clay above it, and from the steepness of the banks, the crookedness of the shore, and the violence of the currents, the whole three points taken together form one of the principal obstructions to the navigation of this part of the river in either batteaux or durham boats, and one to overcome which the greatest power in men or horses is required, and the greatest expense is incurred. To make such an improvement as to obviate the difficulties and danger that present themselves at this point, and one that will be at once permanent, safe and convenient, an inland cut has been projected, from the still water in the Bay above station 22, following a valley which seems to have been an ancient branch channel for the water of this river, to a little bay near station 19, in which there is 3 feet water on a bottom of clay and small stone close up to the shore, in which boats from the offing can conveniently come in their ascent, and the depth of water in which will be considerably increased by the introduction of a strong current by means of a sluice cut through this valley from the superior level in the bay above station 22. In order to give to this cut sufficient breadth for Durham boats when ascending through it to use their setting poles on both sides without injuring the bank, it is proposed to excavate it 18 feet wide at bottom, in conformity to the cuts before mentioned, deep enough for boats carrying 25 tons as above mentioned, by giving 30 inches depth of water, and to construct a tow path in the bank on the land side of the cut of 80 feet wide; and this, 4 feet above the surface of the summer water so that its surface shall not be corroded by the spring freshets passing over it, and to give the banks the slope shewn upon the transversal section No. 1. on the plan. This condition being necessary to provide against the natural propensity of earth to press inwards in such cases.

The mean velocity of the current round the *Pointe du Moulin* comprehending the three points, is 11. The velocity the same difference of inclination would give on a plane extending 2.5 more in distance which is the ratio between the sum of the distances in which the rapids occur at this place; and the length of the proposed cut on an inclined plane is 6.6-10. The current therefore in the sluice would run at the rate of 6.6-10 miles per hour, instead of full 14 which it now runs for a considerable part of the distance round the lower point near station 20, making a vast difference in the power necessary to overcome the existing impediment, besides the degree of safety which attaches itself to this mode of improvement.

Boats are frequently detained whole days, and it is known, that they have remained several days at the foot of the Rapid, at this point, before they could find means to surmount the difficulties that here present themselves. That some considerable improvement and amelioration is necessary in this situation, therefore, is quite obvious, and no plan appears to afford so good a prospect of success in fulfilling the conditions required, as the one proposed above; see Profile and section No. 1.

From *Pointe du Moulin* or rather the Bay above station, 22 up to the *Pointe* at station 23, about 250 yards, there is no current, the water is deep enough for our purpose at a moderate distance from the shore the bottom is clay, there is no beach, the bank is steep, and the public road is at the very edge of it; there is therefore no necessity for a tow path, nor could one be constructed in this distance, without injuring or entirely destroying the present high-way.

Tower's Point—At this place and for 800 yards farther up, the water is very shallow both near in and far out from shore, and from

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this circumstance and the rapidity of the current, considerable obstruction to the navigation presents itself, opposite station 23, in 3 feet water the current runs at 10 miles an hour, and farther up, opposite a small Island, 8 miles, in 3 feet water, thence towards the TANNERY in the Bay below the POINTE-AUX-CEDRES, it decreases in velocity until we come to still water, at the lower extremity of the cut proposed through that Point. To improve the Navigation along these 800 yards, two methods suggest themselves—one of which, and that to which the most confidence seems to attach itself is, to excavate in the beach, which is very stony however, for the required breadth of 18 feet, to about 2 feet deep, the whole way, then by means of a weir to be constructed of loose stone in the way that Eel weirs are made (and which materials may be found on the bottom) all along from the small Island opposite the Tannery, nearing the shore in descending to station 23, and throwing into the sluice any quantity of water which might be found necessary for the purpose, to construct a tow-path along the side of the bank which does not in any part of this distance rise very abruptly from the water edge, is very straight, and composed of a stony Gravel, interspersed with large pieces of grit stone offering a favourable foundation for the construction of a good and permanent work.

The other method is a very simple one, and were it not that it would increase considerably the velocity of the current in the narrower part at the lower end of the sluice, it would be preferable on account of its cheapness. The same kind of weir might be erected as in the other case and of the same extent, only higher in order to raise the water high enough without any excavation, other than clearing away the loose blocks of stone which are to be found strewed along the bottom near the beach.

In putting in practice either of these last mentioned improvements, however, it would be necessary to provide for the removal of another obstruction, viz: a Carding Machine which is here built upon the beach, and partly over the water, projecting its works out considerably into the Rapids, and forming a considerable impediment to the Navigation of this part in any kind of Boat, and water brought down by the means above proposed, would in either case drown the water wheel of this Machine and render it perfectly useless, but as such improvement is absolutely necessary to be made, in the Navigation at this place and as this Mill is an obstruction to it and an encroachment upon the rights of the public in this case, it may be a question how far any expense will necessarily be incurred to afford indemnification to the proprietor who has thus encroached.

POINTE AUX CEDRES.—At the head of the Commissariat Wharf, where the current is not very strong, and where all the Boats stop to re-load, that portion (4-5) of their cargo which may have been carted over land, from the Cascades, there is 6 feet water, and so there is in proceeding downwards to opposite the lower end of the Village; but it there commences to shallow, and becomes more and more so in descending all round the Point, until in sounding through the narrow passage between a small Islet, near the shore and through which Boats generally pass up, we find but two feet water, a very solid rocky bottom, a Current or Rapid running at the rate of from 5 to 12 miles per hour, in a situation too much exposed to the common destruction from ice in the Spring, when the water is high, to justify the disbursement of any considerable sum for the erection of a tow-path, or for excavation along the beach, both of which would require to be done in case of making the improvement externally.

The difference of level from the Commissariat Wharf at the Village to the little Cove at the Tannery, below this Point, is 12 18-100 feet, and the distance on the route indicated by the red line on the Plan is 40 33-100 Chans, which will give a velocity to the current on an inclined plane extending from one extreme to the other of this distance, of 8½ miles per hour, instead of full 12, which the lower part of this Rapid now runs at.

In order to provide therefore for the more easy, safe and expeditious transit of Boats in their ascent past this point, it is proposed to cut a Sluice through it from the Commissariat Wharf, at the Village to the little Cove at the Tannery, following the route indicated by the red line touching these two extremes on the Plan—and to introduce into it the quantity of water in depth and breadth, as shewn in the transversal Section No. 1, and longitudinal Profiles No. 1 and 2, to slope the banks and construct a tow-path upon the same side and of the same breadth as proposed for the **POINTE DU MOULIN**, as mentioned in that Section; the tow-path in this case would form a continuation of that from Station 23 to the Tannery, and greatly facilitate the ascending of Boats to this place—and whereas there is now much danger attending their ascent, by their swinging off, breaking their tow-lines, and sometimes dragging the Horses and Drivers with them down the Rapids—this improvement will provide for a perfectly safe Navigation, with a current not more than two-thirds as strong as that which now opposes their ascent, as well as for the most advantageous direction of applying the power which it may be found necessary at any time to employ in towing up any description of Boats.—See Section & Profile No. 2.

The above, and a trifling improvement, by removing some stones and 10 or 12 yards of excavation by 3 yards wide and 2 feet average depth, at a small projection on the Beach opposite the Church at the Village would complete the necessary improvement in the Navigation from the **CASCADES** to this place inclusively, for boats of as great burthen and drawing as much water as is to be found in the locks either above or below this place. But notwithstanding Boats with their lading above mentioned do navigate the whole distance between this place and the **LAKE ST. FRANCIS**—yet it is a very intricate Navigation, difficult, and in several parts dangerous, and susceptible of being much facilitated and rendered much more safe by the application of the same description of improvement at the different points throughout the distance where impediments exist or obstructions occur, as we have proposed for the amelioration of that between the **LAKE ST. LOUIS** and this place.

From the **VILLAGE** of the **CEDARS** exclusively to **POINTE A-MARCOUX**, a distance of 65 chains, there is little or no current—a smooth clay bottom, and water enough near the shore—but the bank being almost perpendicular, subject to slide off frequently, and for the most part carrying the public road close to the edge of it—a tow-path cannot be constructed along it of any durability without either incurring its liability to be frequently embarrassed with the sliding down of the bank, or the destruction of the public road, consequently involving the ruin of some of the buildings erected along one side or the other of it. But a tow-path is not necessary here, for there is hardly any perceptible current downwards in any part of the distance—in some parts it is eddy and countercurrent to the middle stream, and the least exertion of the crew of any boat will take her along the whole of this route in perfect safety.

POINTE A MARCOUX.—At this point, at 30 feet from shore in one fathom (6) water the velocity of the current is 6 miles per hour; the bottom near the beach is full of manageable blocks of stone, and which, if they were cleared out and an excavation made in the beach of 80 yards long, 3 yards wide, and 1 yard average deep, would afford a much easier passage for the ascent of Boats than it does at present—Horses are used to tow up boats here 2 to 4 for each boat; but if this improvement were made, a much less power would prove sufficient, for then, instead of the power being applied in the oblique direction it now is, and by which means a great deal of it is lost, it would be almost in a line of the shore, and by the means of a short tow-path the horses could exert their strength to much greater advantage.

From **POINTE A MARCOUX** to **POINTE A BIRON** there is an eddy, a deep bay and shallow far in, and boats do not follow the shore in it but are set along in the offing with their setting poles or by means of oars. A tow-path from one of these points to the other, therefore, would be perfectly useless.

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POINTE A BIRON.—At about 50 feet from shore the water is 6 feet deep, the velocity is 9 miles per hour in a distance of 100 yards. This being a considerable obstruction, horses are used in towing boats, and it is by this means only that boats with their lading (at least D. B.) are enabled to surmount the difficulty. Some amelioration then appears to be necessary, which might tend to reduce the number of horses employed, and to expedite such boats on their voyage upwards. The bottom is like that at POINTE A MARCOUX, stony with large but manageable blocks lining the shore. The soil is also like it—gravelly clay, and may be called stony. 100 yards of excavation partly under water and partly in the beach, 4 yards wide by 1 yard average depth, would be all the improvement necessary at this place, except a tow-path for the whole length. These would most undoubtedly facilitate the progress of boats upwards, by the cleaning out of obstructions, straightening and otherwise improving the navigation.

From POINTE A BIRON to POINTE A LA GLAISE, a distance by water of about half a mile, there is but a gentle current and no difficulty to overcome which may require improvement. A part of the way the boat track is in still water far from shore; the public road is on the edge of the Bank in the rest of the distance, and being very steep and high, composed of clay frequently sliding down, affords no opportunity of constructing a durable tow path in it or upon it, for it is too high and the frequent indentures in it makes it unfit for that purpose, especially where it is not absolutely required to enable us to surmount some commensurate difficulty.

POINTE A LA GLAISE.—There is a certain part of this point where the current passes at the rate of 5 miles per hour; but as there is 6 to 4 feet water close in to the bank, and the distance past which the swiftest of the current passes, not more than 10 or 12 yards, it is not thought necessary to make any improvement in this place, for boats can always get past by the means they always carry, and always must necessarily carry with them.

From POINTE A LA GLAISE to POINTE A WATIER, 130 chains, there is scarcely any current downwards, and in some parts counter-currents. The water near the shore is shallow, but at a moderate distance from it there is water enough. No improvement is necessary throughout this extent as there is no particular obstruction to be overcome, and the reasons for not constructing a tow-path, are the same as those given between Pointe à Biron and Pointe à la Glaise.

POINTE A WATIER.—At this place at 50 feet from the shore in 6 feet water, the current has a velocity of 9 miles per hour. Batteaux now ascend this point with their full loads by means of their setting poles only; yet the obstruction is considerable, and especially for Durham boats. It impedes their progress, if nothing else. They however, employ horses on such occasions, and since this is the case, some improvement will be found to answer a good purpose. 70 or 80 yards of excavation 3 yards wide by 4 feet average depth, will be the utmost limit to which it need to be carried at this place to straighten the point, that the boats may come to the current in a direction parallel to it, and a tow-path 80 yards long; so that whatever power it would be thought proper to employ in overcoming this difficulty, might be employed in the most advantageous direction.

From POINTE A WATIER to SIMPSON'S POINT, a distance of about two miles, the water is rather shallow near the shore, but Boats in ascending may keep out far enough to find the required depth without having to oppose more than about 1 mile per hour of current, the bottom is of clay and quite smooth all the way, and the whole of the navigation of this part may be conveniently performed by means of Oars, Sails, or setting Poles, which methods have always been counted as possessing considerable advantage over all the methods art can devise to improve the Navigation of large Rivers throughout the world. It may be urged however, that in consequence of there being no interruption to the Navigation along this distance, Boats would be expedited in case of high wind, or calm weather, if some power on the land could be ap-

plied to them, which would propel them forward with greater speed than they could possibly attain by any common means in such cases. But this condition can only be fulfilled by constructing a tow path along the margin of the River, and which not being absolutely necessary in order to procure that species of facility to the Navigation to which our instructions seem to have directed our attention, [for if instead of Rapids and a thousand of other obstructions which we meet with at short intervals throughout the extent under examination, we had such Navigation as occurs in these two miles, it would not have been found necessary to expend the public money to ameliorate it,] none is provided for in our estimate.

To construct a continuous tow-path along this distance would be attended with considerable expense, and by it we should attain no other object than that of greater speed, but if boats had to pay for such construction, they would find that the difference of expense would more than balance the difference of speed, and it would still be preferable to navigate by the more ordinary means of Oars, setting Poles, or with Sails when the wind permitted. The bank is from 12 to 18 feet high almost throughout the whole of this extent, it is of marley clay, rises almost perpendicularly up from the water, leaving very little beach, and bears the public road quite near its edge. It is liable to slide down for two or three arpents at a time along the coast, at all times of the navigable season, and immediately after a rain storm which succeeds a succession of dry weather, in the spring also when the clay is thawing and yet retains sufficient moisture to enable it to slide. The slides form great indentures all along the bank, and from the force with which these great bodies of clay descend, they often continue their course to 20 or 30 yards out into the river, there forming new points of land as it were, and furnishing the matter of deposit, which is discoverable near the shore all along the coast, sometimes several of these slides take place in one day or in one night, at different times through the summer, and to such an extent as to carry away part of the public road, as was the case in October last, along the distance here alluded to, and had a tow-path or any other work of art been constructed in the bank or on the beach, at that time it must have been rendered useless for a length of time, perhaps destroyed altogether; and if a tow-path, with men and horses upon it at the time, they would have been in danger of being buried up in the debris or swept off into the river.

Durham-Boats are now towed, not only up the several Points where obstructions occur in the shape of Rapids, from the Cedars to this place, but also along some of the intermediate spaces, by using the public road for a tow-path, and a very long tow-line, they practice it along the space under consideration, and with their tow-lines raze all the vegetable from the edge of the Bank, which, if it were left to grow would be some support to it, and in some measure prevent its more frequent caving down. This might be remedied by laying a rail (continuous) along the edge of the bank for the tow-lines to bear upon, but from the very circumstance of the frequent sliding down of the Bank, it would become somewhat expensive to keep it in repair, we shall not therefore propose any improvement in the Navigation of the Section we have just had under consideration.

From SIMPSON'S POINT inclusive to POINTE AU DIABLE, the water is sufficiently deep for the purposes of navigation close in to the shore, and it being an eddy formed by the current above it, neither tow-path or any other improvement is required.

POINTE AU DIABLE.—At this place, at 60 to 70 feet from the shore, in 2½ fathoms [15 feet] water, the velocity of the current is 14 miles per hour, the bottom is covered with manageable blocks of stone. It has some breadth of beach, and considerable at the lower extremity of the point. Horses are here used to draw up all description of boats, and with those now in use when laden, the difficulty here can scarcely be surmounted any other way, except by means of a sail when the wind blows hard from the east or south-east. The impediment to the Navigation at this point arises from the extraordinary velocity of the current

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[for it is not rough] and the particular curve of the shore; and in order that the horses may draw as much as possible in the same direction the boat is moving, a little boy generally mounts one of them, and at the risk of being dragged with the animals (of which they employ from 4 to 6 to each boat) down the current. He leads or guides them into the stream to some yards from the shore, and continues in that direction to take up the boat. Both above and below the point the water is deep close in, but in going round it the water is very shallow near the shore; and although an excavation might be easily effected in the beach and partly in the current to facilitate the Navigation, yet as the point is so much exposed to the ice from above, and the shore so very crooked, it has been thought most proper to construct our improvement inland.

To improve the Navigation at this place in such a way as to be at once convenient, durable, permanent, cheap and expeditious, therefore, it is proposed to cut a sluice through this point from the still deep water above where it is a clay bottom, to the still and deep water below, where the bottom is stony, in the direction and position indicated by the red line on the Plan, and of the dimensions marked in the Profile and transversal Section No. 3, with a tow-path if necessary upon the land side of 8 feet wide, as projected for the cuts represented in Sections 1 and 2, for Pointe du Moulin and Pointe-aux Cèdres,—but in making this proposal it also occurs that a still farther and more useful improvement may be made here by suppressing the towing path entirely; and as the line of the shore a little above the point corresponds with the direction of the proposed cut through it, to place a capstan as a fixture in the bank at a convenient distance above the upper extremity of it so as to be on a line with the sluice, at the lower extremity of which should be a snatch block to receive the bight of a hawser, the two ends of which being spliced together so that it might continually revolve, and long enough that the other bight might reach to the capstan and make one turn round it, that boats ascending might immediately on their arrival make fast to one of the parts of the revolving hawser, and send two, three, or four men forward to the capstan, who would warp her up in less time, in greater safety, and certainly at a cheaper rate than the same could be done by employing horses. Boats often lose much time in waiting for horses at this point, but by the above method not a minute need be lost.

From **POINTE AU DIABLE** to **MR. BEAUDET'S POINT**, at station 101, there is hardly any current. In some parts eddy however, and a counter-current is observable, deep water close in shore, and boats never employ any horses or other foreign power to enable them to perform this distance. A tow-path would be extremely difficult of construction in great part of the coast, and if constructed would be found useless. We therefore do not propose any amelioration in the Navigation under this head.

From **MR. BEAUDET'S POINT** to the **Military Locks** at the **COTEAU**, some difficulty presents itself—the current rushing out of **RIVER A DELISLE** is considerable proportion to the whole—turns close round the point into a deep bay, known to the batteaux men by the name of **FER A CHEVAL**, from which it rushes out with considerable force over a bed of lime stone which here obtains—and in a direction perpendicular to the axis of the main River. On its arrival at the line of direction between the two points, it falls over the edge of the bed of lime stone (which seems here to terminate abruptly in water of from 1½ to 2 fathoms (9 to 12 feet) deep—and this being too great a depth for using the setting poles with advantage and too strong a current in the main stream for oars—the batteaux when the water is high, are obliged of necessity to go into this **FER A CHEVAL** against a very rapid current in shallow water—and get out of it at the upper side by working against impediments there again of the same description.

Now to obviate the difficulty existing at this place and one too which the boat-men all stand in dread of—the following plan is proposed. There is on the line from **BEAUDET'S POINT** to the point below **RIVER A DELISLE**, at more than half way across, a large Rock, quite up to the side of which there is 9 feet water; and it is proposed to fix an iron stanchion

in this—to fasten a rope to it, of sufficient length with a buoy (a.) at the end of it for the facility of taking it up to reach down to opposite BEAUFET'S POINT—and in which direction the main stream of the river will carry it—so that boats in ascending may, on quitting their oars or setting poles—take up the Buoy (a.) and by overhauling the rope, be warped up to the rock (A.) without difficulty by means of the boat's crew and without any other aid—and there take up the warp (A. B.) fastened to a fixture in the small Island (B.)—overhaul it, or a sufficient quantity of it to bring her into still water opposite those Islands—where there is no difficulty in getting into the locks which lead through the fortification at this place.

At MR. EVATT'S POINT up to which from the military locks there is no obstruction, and boats drawing 30 inches water may and do navigate—there is 30 yards of very swift current at the rate of 6 miles an hour, it runs in 2 feet water through a sluice which has been excavated in the beach and in the water. This would only require straightening, widening and deepening, to make it conformable to what has been projected farther down, and prove a sufficient improvement except a tow-path at this place.

From EVATT'S POINT to the RIGOLET about 100 yards, there is not much current, and nothing to prevent boats from performing this distance by the common means—but at the RIGOLET there is only 2 feet deep of water and the current runs at 6 miles per hour in a distance of about 100 yards. The loose stone have been removed in the RIGOLET, and for a considerable distance above the small Island seen on the plan, near the shore—which together with the proceeds of excavation, throw it into the shape of a sluice—and from which it receives its name of RIGOLET. It answers the purposes of navigation well enough in the spring when the water is high—but as soon as the water gets low the boats are obliged to go outside of the larger of these two Islands—and ascend by means of their setting poles until they approach the shore again a little above the RIGOLET. Some improvement therefore is necessary at this place—and to effect which it will be proper to excavate 1 foot deep by 18 feet wide along the whole of the 100 yards—throwing the proceeds of the excavation to the outer side, and to carry on a kind of embankment, obliquing outwards, considerably above the required depth of water, and in the manner indicated by the red line on the plan, to throw into the sluice a greater quantity of water than could be procured by its being left to flow in of its own accord without the help of such embankment or jettée.

From this place to FRENCH'S RUN the current is not very strong in any part of the distance, nor does any thing occur to obstruct the navigation or prevent boats from performing it with the ordinary means—in a depth of water quite sufficient at a moderate distance from the shore. Except recommending a tow-path, therefore, we propose no amelioration in this space.

At FRENCH'S RUN by removing the loose blocks of stone at the bottom, there has been a sluice opened with 2 feet water, but it is too narrow and crooked for the general purposes of Navigation, when the water is low in summer and autumn—the current here has a velocity of from 6 to 10 miles per hour in a distance of about 100 yards and forms a considerable obstruction to the Navigation, in so much that most of the boats in the latter part of summer prefer crossing over to French's Island, where Battaux find deeper water in which to work up with their setting Poles—and Durham boats can be drawn up by means of horses which are ferried over in a Scow for that purpose—from the head of this Island they row or set the boats across again to near station 108, on the main shore, and thence they all ascend past a long marsh to near McDonald's Point by the ordinary means of Oars or setting Poles, or both.

A sufficient improvement may be made at FRENCH'S RUN—by 160 yards excavation—18 feet wide by 1 foot deep—and which with a towing path would save a great deal of expense to, and greatly facilitate the progress of the boats in their ascent.

From FRENCH'S RUN to the LITTLE RAPID at the lower end of the marsh between stations 108 and 109, the water is rather shallow near the shore—but deep enough for our purpose at a moderate distance out—the length of this section of coast is about half a mile, and the velocity of the current is about 2 miles per hour—the impediments are blocks of stone, &c. near the shore throughout—and at the upper extremity where the red line shows that improvement is required, the water is so extremely shallow that boats have to go to an inconvenient distance from the shore in their ascent, and often have to work to great disadvantage.—It has therefore been thought proper to propose for improvement at this place the removal of some loose stones along shore, an excavation at the upper extremity of 60 yards long 18 feet wide and 2 feet deep, and to construct a continuous tow-path on the bank, which is every where very low and of a favourable composition for this purpose all the way down to the Coteau Locks—which with the other improvements above mentioned will be a sufficient amelioration for the distance.

From the lower end of the above mentioned marsh to the foot of the Rapids at station 110, at the lower part of McDONALD'S POINT, there is little or no current—no obstruction to the navigation—and as the construction of a tow-path upon the marsh would be attended with considerable expense—without any commensurate object being attained by it—we have no improvement to offer for this distance of the shore.

McDONALD'S POINT.—There are three places in navigating round this Point where horses are used to draw up Durham Boats—the current at the two lowermost points runs at the rate of 4 miles, and at the upper point 3 miles per hour—the distance at each is about 60 yards—the impediment at each arises from the strength of the current—shallowness of the water—and the stonyness of the bottom—and the sum of the improvement required at these in order to overcome the difficulty and render the navigation comparatively easy will be 180 yards of excavation—18 feet wide by 2 feet deep on an average, partly on the beach and partly under water—which with a continuous tow-path from one extreme to the other, a distance of about half a mile—will be a sufficient amelioration—bring us into the still water of Lake St. Francis, and terminate the detail of improvement we proposed to enable Batteaux and Durham Boats with their ordinary cargoes to navigate the whole of the Rapids from Lake St. Louis—without discharging any particular portion thereof.

The following is a detail of the probable cost of the proposed improvement throughout the whole extent—the table also exhibits the probable cost of an improvement on a more extensive scale along the same track and providing for the ascending of boats drawing four feet water, as the Durham Boats now draw when full loaded in descending the Rapids but to which depth it is not very probable they will ever load when about to ascend, as their lading in that case consisting of different species of merchandize, cannot be found weighty enough according to the bulk to bring a boat down so low in the water by $\frac{1}{2}$ as when laden and filled quite full of heavy articles of produce—such as they are now in the habit of carrying in their descent to the Ports of embarkation.

DETAIL.

IMPROVEMENT.	Cubic Yards.	Rates.	Lower Scale.			Cubic Yards.	Rates.	Larger Scale.		
			\$	s.	d.			\$	s.	d.
At the Clearing from the Upper Locks at Split Rock, 80 yards $\times$ 6, and of 80 inches deep.....	1500	3/0	23	3	6	3380	3/0	54	0	0
At Points Δ Delisle, excavation 100 yards $\times$ 6 yards $\times$ 2 feet.....	400	1/0	30	0	0	800	1/0	40	0	0
[100 yards of tow path on the beach....		3/0	15	0	0		3/0	15	0	0
From Points Δ Delisle to Points Δ Chien, 660 yards excavation, 6 yards wide $\times$ 1-3 deep.....	1980	1/0	99	0	0	3960	1/0	198	0	0
Tow path, 660 yards long.....		3/0	99	0	0		3/0	99	0	0
At Points Δ Chien, 30 yards excavation, 3 yards wide $\times$ 1-3 deep.....	900	1/0	15	0	0	360	1/0	18	0	0
[Tow path, 30 yards.....		3/0	4	10	0		3/0	4	10	0
At Points Δ Coulonge, 100 yards excavation by 6 yards $\times$ 1-3.....	600	1/0	40	0	0	1300	1/0	60	0	0
[100 yards tow path.....		3/0	15	0	0		3/0	15	0	0
At Points Δ Chenette, 30 yards $\times$ 3 yards $\times$ 3-3 excavation.....	240	1/0	12	0	0	300	1/0	15	0	0
[30 yards tow path.....		3/0	4	10	0		3/0	4	10	0
At Points du Moulin, excavation including tow path according to Profile and Section No. 1.....	40139	1/0	2008	19	0	41937	1/0	2099	7	0
From Tanvet's Point to Little Cove at the Tannery excavation.....	9300	2/8	400	0	0	4800	2/8	600	0	0
[Dam of loose stone 484 yds. Tow path, 900 yards long.....		3/0	191	0	0		3/0	191	0	0
At Points aux Cedres, excavation including tow path according to Profile and Section No. 2.....	63099	1/0	3154	19	0	65407	1/0	3270	7	0
Amount of probable expenses from the Cascades to the Cedars inclusive.....			\$	6155	0		\$	6733	14	0
At the Village of the Cedars opposite the Cedars Church, excavation 12 yards $\times$ 3 $\times$ 2-3.....	34	2/0	2	8	0	36	2/0	3	12	0
At Points Δ Marconix, excavation 30 yards $\times$ 3 $\times$ 1.....	90	1/0	4	10	0	120	1/0	6	0	0
[30 yards of tow path.....		3/0	4	10	0		3/0	4	10	0
At Points Δ Hiron, excavation 100 yards $\times$ 4 $\times$ 1.....	400	1/0	20	0	0	600	1/0	30	0	0
[100 yards of tow path.....		3/0	15	0	0		3/0	15	0	0
Points Δ Watier, excavation 80 yds. $\times$ 3 $\times$ 1-3.....	580	1/0	16	0	0	480	1/0	24	0	0
[80 yards tow path.....		3/0	12	0	0		3/0	12	0	0
Points au Diable, excavation in conformity to Profile and Sec. No. 3, including a tow path.....	7210	1/0	360	16	0	7480	1/0	374	0	0
[Fixing a Capstan in the bank above, and a revolving hawser with a snatch block.....			50	0	0			50	0	0
From Mr. Baudet's Point to the Military Locks at the Côteau, for fixtures in the Rocks, Cables & Buoys.....			30	0	0			30	0	0
At Mr. Ervitt's Point, for the removal of some obstructions and partial excavation.....			30	0	0			40	0	0
At the Rigolet, excavation 100 yds. $\times$ 6 $\times$ 1-3 under water.....	300	5/0	50	0	0	600	5/0	150	0	0
At Frenches Run, excavation 100 yards $\times$ 6 $\times$ 1-3 mostly under water.....	900	3/0	30	0	0	300	3/0	45	0	0
Removal of loose block of stone, from Frenches Run up to the commencement of marsh.....			60	0	0			80	0	0
At the commencement of the long marsh, excavation 60 yards $\times$ 6 $\times$ 2-3 under water.....	340	5/0	60	0	0	380	5/0	90	0	0
A continuous tow path from the Côteau Locks up to this place, 1 3-4 miles at 3 per yard.....			312	0	0			312	0	0
Sum of improvement proposed at McDonalds Point, excavation 180 yds. $\times$ 6 $\times$ 2-3 principally under water.....	720	2/8	90	0	0	1080	2/8	135	0	0
[Continuous tow path for the whole distance, 660 yards at 2.....			99	0	0			99	0	0
To purchase Land at the Pointes du Moulin, des Cedres and Pointe au Diable.....			200	0	0			200	0	0
Salary of an Engineer to superintend the work of improvement, 3 years at \$300.....			600	0	0			600	0	0
Amount carried Over.....			\$	2201	4		\$	9283	16	0

DETAIL.

Larger Scale.

£ s. d.

54 0 0

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15 0 0

4 10 0

2099 7 0

600 0 0

131 0 0

120 0 0

270 7 0

733 14 0

3 12 0

6 0 0

4 10 0

80 0 0

15 0 0

24 0 0

12 0 0

74 0 0

50 0 0

30 0 0

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IMPROVEMENT.

Cubic
Yards.

Rates.

Lesser Scale.

£ s. d.

Cubic
Yards.

Rates.

Larger Scale.

£ s. d.

Amount brought Over.....

8201 4 6

9033 16 0

Salary of an assistant Engineer, 2
years to £150.....

300 0 0

300 0 0

Additional Salary of the Engineer,
(For deepening the Canals at
Cascades, Split Rock and
Côteau, and to superintend
the construction of new
Locks,) 1 year at £300....

Assistant, 1 year at £150.....

300 0 0

150 0 0

Construction of 7 new Locks or
their equivalent at £2000 each.....

14000 0 0

Excavation in solid rock grit at
Cascades, and Split Rock—and in
Lime Stone at the Côteau, to widen
the Canals and Lock Pits.....

[20 per cent for Contingencies.

1700 4 1

2000 0 0

5156 15 2

£ 10201 8 7

£ 30940 11 2

It will be seen that the most remarkable difference between the lesser and larger of these two estimates arises from the expence which it would be found necessary to incur for deepening, widening and constructing new locks at the several Military Posts—Cascades, Split Rock, and Côteau du Lac—and the immediate consequence of constructing such work. Those locks have been inserted in our estimate upon the supposition that it is possible the Military Government may be induced to give them up to the Provincial for the above purpose—particularly as some of them are now in a bad state, and in the course of a very few years will all require a thorough repair to render them serviceable—and more particularly as the Rideau Canal, it is quite probable will, soon become the common route for the transport of military stores, troops, baggage, &c. from Montreal to Kingston, and between which two places there is no military establishment on the Catarqui which seems to require so expensive a system to be kept up for the transport of Government Stores, &c. to it—as that it has been heretofore found necessary to adopt in the construction of the above locks.

But if the military government should think proper to retain them and find it convenient to enlarge and deepen the canals, and to rebuild the locks—then the estimate on the larger scale would be found to exceed the lesser in so small a proportion—it would most undoubtedly be adopted by preference—as being the most capacious and providing for the ascending of the largest dimension of boats with their full load which it is safe to run down the rapids with—let them be laden even with the heaviest merchandize.

As to the Navigation of the Rapids from the Cascades to the Cedars by steam-boats, it will be seen by the detailed account of the velocity of the current at several different points between those places and the almost continued obstruction they would have to meet with of a different nature throughout the greater part of the whole extent—that it is entirely out of the question, except by means of an inland Canal, which does not seem to be in accordance with either the letter or the spirit of the Act of Parliament from which our instructions are derived.

But from the Village of the Cedars to PRISON ISLAND opposite the COTEAU FORTIFICATIONS, a steam-boat which would run at the rate of 10 miles an hour could go quite up to that island and through which if a cut were made to still water at the south side, and another cut through the upper end to the separation of the water that now runs down each side of it and forms the rapid—and fixtures placed at each of those cuts to warp her through, she might then proceed along the outside of French's Island to the strong current to be met with at a point near the head of it running at 10 miles—and if no cut were made in this, similar to those

through Prison Island—then the steamer should run at the rate of 12 miles an hour to be able with any degree of safety to proceed—these three obstructions being got over however there is no other rapid or any other obstruction to prevent a steam-boat, with an engine of moderate power to get up into Lake St. Francis, for the current no where in that distance runs more than 4 miles per hour—and there is sufficient depth of water for the purpose.

Such an Improvement without any Lockage might cost about £2000 0 0.

The whole respectfully submitted by,

GENTLEMEN,

Your Obedient Servants,

ALEXR. STEVENSON,

Civil Engineer & Sworn Surveyor.

ANDRÉ TRUDEAU,

Assist. Engineer & Sworn Surveyor.

CEDARS, 26th January, 1831.

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